Data Sources

The Connecticut Department of Public Health (DPH) Asthma Program monitors the burden of asthma in Connecticut using a variety of data sources. Through legislative reporting mandates, data related to hospital and emergency department (ED) utilization, asthma related to occupational exposure, and asthma in public school children are obtained. Data are also provided by other DPH programs and a research-based public education and advocacy organization. The data sources which inform this report are described in this section. See Appendix B for technical notes.

Data Sources at A Glance

- Behavioral Risk Factor Surveillance System (BRFSS)
    - Asthma Call-back Survey (ACBS)
- Connecticut Hospital Information Management Exchange (CHIME)
- Healthcare for UninSured Kids & Youth Part A (HUSKY A)
- School-based Asthma Surveillance System (SBASS)
- Occupational Illness and Injury Surveillance System (OIISS)
- Connecticut Death Registry

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS), coordinated by the Centers for Disease Control and Prevention (CDC), enables states to monitor the prevalence of the major behavioral risk factors associated with chronic disease, injuries, and preventable infectious diseases among the U.S. population. Using a random digit-dial telephone survey, the BRFSS collects data on the health risk behaviors, preventive healthcare practices, and healthcare access of non-institutionalized civilians aged 18 years and older in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam.[10] The BRFSS survey consists of a core questionnaire and optional modules. Some states also add additional questions. Thus, the BRFSS facilitates collection of data that are comparable across all state populations, as well as data that are specific to the interests of individual states.

Using the core BRFSS questionnaire and optional modules, the DPH Asthma Program is able to calculate two types of prevalence estimates – lifetime asthma and current asthma – in Connecticut adult and child populations. The BRFSS core questionnaire includes two questions about asthma prevalence. The first, "Have you ever been told by a doctor, nurse, or other health professional that you had asthma?" allows calculation of lifetime asthma prevalence in adults. The second, "Do you still have asthma?" allows estimation of current prevalence of asthma in adults. A respondent who answers "Yes" to either of the asthma prevalence questions is asked if s/he will complete a follow-up survey about asthma, the adult Asthma Call-back Survey (ACBS).

Similarly, the Connecticut Asthma Program uses two optional BRFSS modules, Random Child Selection and Childhood Asthma Prevalence, to estimate lifetime and current asthma prevalence in children. Random Child Selection involves asking a randomly-selected BRFSS respondent about presence of children in his/her household. If there are one or more children under age 17 years in the household, one of the children is randomly selected. Information on the child's demographic characteristics and health conditions, including history of asthma, are collected. The parent/guardian is asked "Has a doctor, nurse or other health professional ever said that the child has asthma?" and "Does the child still have asthma?" If the response is "Yes" to either question and the parent/guardian gives consent, the household is called at another time and the adult with the most knowledge about the child is administered the child version of the ACBS.

The ACBS for adults collects data on: asthma history; healthcare utilization; knowledge of asthma management plan; household and living environment; medications; cost of asthma-related medical care; work-related asthma; comorbid conditions; and complementary and alternative therapies. The child ACBS is similar to the adult version. It gathers data on school-related asthma instead of work-

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[10] Complete BFSS questionnaires are available on the CDC website at: http://www.cdc.gov/brfss/questionnaires/questionnaires.htm

related asthma, and inquires about child body mass index and birth weight. The child ACBS does not collect information on comorbid conditions.[11]

Because the BRFSS includes only a sample of the population of interest, all prevalence percentages represent an estimate of the true percent of cases in the population. In order to calculate these estimates, data from the sample are adjusted by a process called weighting. Weighting produces data that are more representative of the entire population. Information about age and sex distribution of the Connecticut population, and the probability of being selected for the survey, are used to weight the BRFSS data.[12] All BRFSS-derived prevalence estimates presented in this report were generated using weighted data.

Hospitalization Data

Data on hospitalization, both inpatient admissions and emergency department (ED) visits, are available from individual hospitals and the Connecticut Hospital Information Management Exchange (CHIME), an affiliate of the Connecticut Hospital Association (CHA). The CHIME-Data Program is a proprietary healthcare information system that member hospitals use to record patient, clinical, provider, and financial information. CHIME began in 1980 with collection of inpatient data from Connecticut's acute care hospitals. Since then, the CHIME database has expanded to include information about care-related finances, hospital-based ambulatory surgery, ambulatory medical records, and ED data.

Connecticut hospitals are legally mandated to report financial, utilization, and certain statistical information to the DPH (Public Health Code § 19a-654). Accordingly, on the behalf of its member hospitals, CHA submits CHIME data to the DPH Office of Health Care Access (OHCA) annually; hospitals that do not participate in CHIME submit data directly to OHCA. Since 2006, hospital discharge and billing data from Connecticut's 29 acute care hospitals and one children's hospital have been submitted to OHCA. Although these data do not contain information on all persons with asthma in Connecticut, they provide a picture of persons with the most severe or poorly controlled asthma, and those who may not have appropriate access to preventive care. The hospitalization or ED visit information in this report, unless otherwise stated, refers to persons with a primary diagnosis of asthma (*International Classification of Diseases-9-CM* codes 493.0-493.9).

HUSKY A

The State of Connecticut provides subsidized health insurance coverage to eligible residents through Healthcare for UninSured Kids & Youth (HUSKY). HUSKY A provides free health care coverage

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[11] The adult and child Asthma Call-back Survey questionnaires are available online at http://www.cdc.gov/asthma/pdfs/SurveyQuestionsAdult08.pdf and http://www.cdc.gov/asthma/pdfs/SurveyQuestionsChild08.pdf, respectively.
[12] More information about the weighting formula used to adjust BRFSS data can be found on the CDC website at http://www.cdc.gov/brfss/technical_infodata/weighting.htm.

for persons in low income households. HUSKY A members are children under age 19, their parents (or relative caregivers), and pregnant women.[13]

The health services that must be delivered to Medicaid recipients under age 21 compose the Early Periodic Screening, Diagnosis, and Treatment (EPSDT) Program. These comprehensive health services, listed in United States Code, Title 42§ 1396d(e), include health screenings, health education, dental services, developmental tests, case management services, personal care services, and special services that are of medical necessity. Connecticut Voices for Children (CVC) monitors the impact of managed care on children's health under the EPSDT Program using enrollment and encounter data from the Connecticut Department of Social Services (DSS). CVC issues annual reports on asthma prevalence and asthma-related health care utilization and quality among children enrolled in HUSKY A.

CVC estimates the annual prevalence of pediatric asthma in Connecticut's Medicaid population using a modified version of the National Committee for Quality Assurance (NCQA) criteria for persistent asthma. CVC determines the percentage of children under age 21 who: 1) were continuously enrolled in HUSKY A for the entire calendar year; and 2) received any inpatient, outpatient, or emergency care with a *primary or secondary diagnosis of asthma* (ICD-9-CM codes 493.0-493.9) or *prescriptions for asthma medication.* In 2005 and 2006, one or more prescription asthma medications were sufficient to meet inclusion criteria; in 2007, four or more medications were required (Lee & Learned, 2007).

School-Based Asthma Surveillance System

In accordance with Connecticut General Statutes Section 19a-62a(b), since 2003 the DPH Asthma Program has conducted school-based asthma surveillance using data from the Health Assessment Record (HAR). The HAR is distributed to school health care providers by the Connecticut State Department of Education (SDE). Pursuant to CGS §10-206, the HAR records physical exam findings, screenings, immunizations, and chronic diseases (asthma, anaphylaxis, allergies, diabetes, seizures, and other). Information on medications that need to be taken in school, insurance status, asthma severity, diagnostic source, and school location are also recorded on the HAR. Demographic information captured on the HAR includes: age, gender, race, and ethnicity. Based on the options provided by the legislation, school districts choose the grades for which health assessments will be conducted. The districts may choose to require a HAR for each student in grades pre-kindergarten (PK) or kindergarten (K), 6 or 7, and 9 or 10.[14]

The School-Based Asthma Surveillance System (SBASS) entails school districts submitting HAR data on students with asthma to the DPH Asthma Program annually. A student is considered to have asthma

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[13] HUSKY A was Medicaid managed care until January 2012 when Connecticut adopted an administrative services organization (ASO) model. It is expected that the ASO will streamline health care administration, enhance the coordination of benefits, and promote the patient-centered medical home (PCMH) model.

[14] Prior to adoption of Public Act 07-58 in July 1, 2008, health assessments for adolescents were required for grades 10 or 11.

if s/he meets any of the following conditions: 1) diagnosis of asthma indicated on the HAR; 2) an order for asthma medication by a health care provider is on file in the school health record; 3) an Asthma Action Plan (AAP) is on file; 4) the child exhibits asthma symptoms at the time of the examination; or 5) a parental note is on file that indicates that the child has asthma. Abstraction of specific demographic and asthma symptom data from the HARs into a designated reporting form is done by public school nurses. The completed reports from each school are sent to the DPH by school district nurse supervisors. Asthma Program staff review the forms for completeness and enter them into a database.

There are two limitations to the SBASS data. First, while the public schools are required to submit to DPH asthma data for the HAR grades only, sometimes HAR asthma data for other grades were reported as well. This was problematic when districts were not explicit about which grades they had selected for HAR completion during a specific school year (e.g., data for both 6th and 7th graders were submitted). In such an instance, the calculation of the asthma rate for the district was made using school- and grade-specific enrollment data from SDE, and selecting as the denominator the count of students in the grade for which the most reports of children with asthma were submitted. This algorithm is explained in greater detail in *Connecticut School-based Asthma Surveillance Report 2010, School Years: Fall 2006 – Spring 2009* (Nguyen, Peng, & Hargrove, 2010, p. 3).[15] Second, data on students with asthma from schools without enrollment data broken down by race and gender were not included in the calculation of race- and gender-specific asthma rates. However, race and gender information was not available for approximately one percent of the reported students with asthma, so there was little effect on race- and gender-specific asthma rates.

Occupational Illness and Injury Surveillance System

CGS §31-40a mandates report of employment-related illness or injury using the Physician's Report of Occupational Disease to the Connecticut Department of Labor. These reports are sent to the DPH Regulatory Branch's Environmental Epidemiology and Occupational Health Section (EEOHA), and the data are recorded in the Occupational Illness and Injury Surveillance System (OIISS). Despite the legal mandate to report occupational illness in Connecticut, there is underreporting (Morse & Schenck, 2011). Approximately 2,100 reports of occupational disease are recorded in the OIISS annually. From the OIISS, information about reported work-related asthma (WRA) can be derived.

WRA is defined as asthma that is caused or exacerbated by exposures in the workplace. The diagnosis of WRA is made by confirming the asthma diagnosis, determining symptom onset, and then

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[15] To mitigate data submission errors, starting with the 2006-2007 school year, districts were asked to clearly state the grades for which HARs were required and informed that the asthma rate would be calculated using only the data for those three specific grades. In other words, for each of the three grades identified by the district, the asthma rate numerator would be the number of students in the HAR grade and the asthma rate denominator would be the total number of students enrolled in the HAR grade.

assessing the relationship between asthma symptoms and factors in the work environment. WRA is classified as either *occupational asthma* (OA) or *work-exacerbated asthma* (WEA). OA is new onset of asthma caused by exposure to sensitizers in the workplace. WEA is pre-existing asthma that is made worse by exposure in the work environment. Reactive airways dysfunction (RADS) is a condition that results from acute exposure to respiratory irritants in the workplace, and is considered a form of irritant-induced OA. In *Asthma in Connecticut 2008*, RADS was presented as a condition that is closely-related but separate from WRA. In this report, informed by the American College of Chest Physicians Consensus Statement (Tarlo et al., 2008), data on and statements about WRA include RADS.

Connecticut Death Registry

Pursuant to CGS§s 7-62b, deaths in Connecticut are reported on the Connecticut Certificate of Death to the Registrar of Vital Statistics in the town where the death occurred. Certified deaths are reported to the DPH Office of Vital Statistics in accordance with CGS §7-42 and maintained in a death registry (DPH, 2012). Office of Vital Statistics staff ensure that deaths of Connecticut residents are captured in the death registry through a reciprocal relationship with counterparts in other states and Canada to obtain copies of death records for residents who died outside of their places of residence. Summary reports of Connecticut mortality statistics are prepared by analysts in the DPH Health Information Systems and Reporting Section (HISR) and submitted to the National Center for Health Statistics (NCHS) for inclusion in the National Vital Statistics Report. The asthma mortality data for Connecticut residents presented in this report were provided by HISR.

The asthma mortality data presented in this report consist of records of death among Connecticut residents for whom asthma was listed as the *underlying cause* or *contributing cause* of death on the Certificate of Death which were coded J45 – J46 in accordance with the *International Classification of Diseases-10*. Underlying cause refers to the first-listed cause of death (i.e., the disease or injury that initiated the chain of events leading directly to death). Contributing cause refers to the second-listed causes of death (i.e., significant conditions that may have contributed to the death).